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RECENT ADVANCES IN CANINE MEDICINE, WITH PARTICULAR REGARD TO BLINDNESS, VIRAL HEPATITIS AND POST-INFECTIVE NEUROLOGICAL DISORDERS*

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INTRODUCTION

Mr. Hodgman and I were very pleased to receive the invitation of your President to address the Division. I am really deputising for Mr. Hodgman, who should be addressing you this afternoon. However, his duties as President of the N.V.M.A. this year made it uncertain whether he would in fact be able to attend this meeting and he therefore asked me to prepare this talk.

Both Mr. Hodgman and I felt that it would be best to discuss only a limited range of problems in canine medicine, problems of which we have had some first-hand experience and upon which we feel we can offer some definite advances to the practice of veterinary medicine; at the same time, we felt it would be a suitable occasion on which to give you a brief account of the aims and work of the Canine Research Station. We hope particularly that I may stimulate discussion at the end of this paper, so that we may obtain more information about the problems which are uppermost in the minds of practitioners.

I shall limit my remarks, therefore, to problems upon which we have been working and I shall not allude to a number of other problems, such as leptospirosis, β-haemolytic streptococcal infections and, only in passing, to paradistemper or " hard-pad " disease, all of which have been reviewed by others in *The Veterinary Record* over the last two or three years and upon which I feel we have nothing very new to tell you. In discussing the former topics this afternoon I have not attempted to deal in any detail with the laboratory investigations, but merely to draw attention to certain points which were likely to be of some interest to practitioners faced with the practical problem of diagnosis, prognosis and treatment.

This brief outline of the work of the Station will I hope serve to explain the type of work upon which we have been engaged (Anon., 1947-50).

BLINDNESS AND THE HEREDITARY FORM OF PROGRESSIVE RETINAL ATROPHY

Blindness in dogs can be conveniently divided into four main groups, namely (1) those due to defects in the optical system in the eye, such as cornea and lens opacities, etc.; (2) those due to disturbances of the retina; (3) those relating to the optic pathways between the retina and the brain, and (4) disorders of the perception areas of the brain itself. The group that I wish to deal with is that relating to the retina.

The most pressing problem is that of the hereditary form of progressive generalised retinal atrophy—so-called " night-blindness "—of Red Irish Setters, an account of which we published in *The Veterinary Record* two years ago (Hodgman *et. al.*, 1949). The disease is characterised by the development of defective vision at night when six to 12 weeks old; the visual defect becomes progressively worse over one to several years, until the dog is completely day blind. This is due to a progressive spontaneous atrophy of the receptor cells of the retina, the rods and cones. Normally the earliest sign of this disease is defective vision at night, at first only on a darkish night, later at twilight, together with changes in the texture of the tapetal fundus. I would stress that these changes are not easy to assess unless you have had much experience of the ophthalmoscopic examination of eyes. Later, when six months old, the changes are sufficiently advanced for one to detect marked reduction in the number of the smaller blood vessels of the retina and a definite pallor of the optic disc, so often inaccurately called optic atrophy, but I must stress that in the early stages these signs are not always easy to appraise. At the same time the average pupil size is increased, *i.e.*, the pupil appears to be more widely dilated than usual in dim lights and the tapetal fundus has a crystalline, rather than granular, texture, and its reflectivity is increased. These changes occur regularly throughout the fundus.

We have been able to establish quite unequivocably that the clinical signs are associated with very definite changes in the microscopic structure and we now have sufficient evidence from over 100 cases to be able to say, with some certainty, what the anatomical picture will be in a given clinical case. We have also, by controlled matings, confirmed that in the Red Irish Setter the disease is hereditary and is controlled by a single main autosomal recessive gene. We have no evidence whatever of more than one main gene being involved, although we cannot rule out that other genes play a subsidiary rôle in the disease. *The disease can be controlled readily by not breeding from affected animals or from those which are heterozygous for the gene, but are not themselves affected, so-called " carriers."*

You will appreciate, therefore, that the crux of the problem is the accurate diagnosis of the disease. Since the Kennel Club now refuses to register dogs affected with a hereditary disease, the diagnosis, either positive or negative, in an individual dog under suspicion determines its eligibility for registration; also it may serve to incriminate or to clear a large number of related animals. It thus becomes a matter of great importance that any diagnosis should be as accurate as we can possibly make it, for a diagnosis subsequently shown to be incorrect has such widespread repercussions not only upon the breeding value of the animal and its relatives, but on the standing of the profession with the breeders.

I have only time to touch very briefly on some points which must be considered in arriving at a diagnosis. Firstly, one must rule out blindness related to the other main groups, namely, to the disease of the optical system, the visual pathways or the cerebral cortex. Having satisfied oneself that there is no clinical abnormality other than that of the

* An address to the South Eastern Counties Veterinary Association on December 13th, 1950.

retina, one must consider whether the retinal atrophy is spontaneous, *i.e.*, without any precipitating causes, or acquired, *i.e.*, secondary to such causes as glaucoma, viral fevers, etc. We have recently had very strong evidence that retinal atrophy can follow in a matter of two or three weeks clinical " hard-pad " disease. We also have under investigation other types of spontaneous retinal atrophy in which the lesions of atrophy are focal in distribution rather than generalised and symmetrical. It is possible by a very careful ophthalmoscopic examination to detect this latter group in life, and it must be considered in the diagnosis of hereditary generalised atrophy; its causation is at present completely unknown.

I might sum up by laying down certain diagnostic criteria for the progressive generalised retinal atrophy of Red Irish Setters, which may help clinicians:—

(1) *The disease commences in puppyhood* and some visual defect should be detectable by eight to 12 weeks of age.

(2) *The disease progresses slowly* to complete blindness without any other neurological signs.

(3) *Increased average pupil size*, especially in low illuminations, occurs in the early stages without loss of the pupillary light reflexes until very late indeed.

(4) *Increased reflectivity of the tapetum* occurs early, due in part to the increased pupil size and in part to a change in the texture of the tapetal fundus from a granular to a crystalline one.

(5) *Performance tests* for visual powers at night are often the best guides in the early stages.

(6) *Ophthalmoscopic examination of the fundus* is of great value, but the signs in the early stages are so slight that much experience is required in their appraisal.

(7) *The pedigree of affected animals* and the visual powers of any related dogs, data on which may be available, should be carefully considered.

(8) *Test-mating of the suspected animal* with an animal diagnosed by a competent person as being actively afflicted with the simple hereditary form of the disease provides the final evidence.

From these remarks you will appreciate that the aetiological diagnosis, namely, that a case of progressive generalised retinal atrophy is, in fact, hereditary, should be made only after the most careful consideration.

Viral Hepatitis (Rubarth's Disease)

We have been able to study in some detail the clinical and pathological features of a natural outbreak which confirms very largely Rubarth's observations in Sweden. As this has been reported in *The Veterinary Record* (Parry, 1950) I do not propose to dwell in any detail on these findings but only to draw your attention to certain salient points.

1. *Clinical Signs.*—In our experience there is considerable constitutional variation in the susceptibility of individual animals, even of the same litter, to the virus, which is not necessarily related to previous exposure or to access to maternal antibody. Dogs from three to 12 months of age are most liable to be affected and particularly from three to six months; older dogs are probably less frequently taken acutely ill. In many cases the first evidence of ill health in the early stages is very slight indeed and even experienced dog owners may not detect any abnormality even when the temperature is as high as 106° F. However, in a number of these cases hysterical episodes occur during the prodromal period and are a useful clinical sign. Those animals which survive 24 to 36 hours of illness and do not show marked pallor or jaundice have a good chance of *recovering completely without special treatment*. Often their appetite is quite good and the full extent of their illness would not be apparent unless a careful clinical examination is carried out; then the temperature will be found to be between 103 and 105°, the heart frequency increased to 140 to 160 per minute and the peripheral pulse to be small, quick and wide. Jaundice occurs in only a small proportion of cases.

2. *Autopsy Findings.*—In those dying of the peracute disease the most conspicuous signs are general pallor, extravasation of blood into the lumen of the gastro-intestinal tract without necessarily any evidence of gross haemorrhage, the accumulation of serous or blood-stained fluid in the peritoneal cavity with fibrin clots on the surface of the liver, and oedema of the gall bladder. On close inspection the liver will be seen to have a fine mottling with pale areas around the vein at the centre of each lobule, but this is not at all conspicuous in the very acute cases. The confirmation of the morbid anatomical diagnosis is obtained by making a simple impression smear by rubbing a piece of liver on a glass slide, fixing with methyl alcohol for two to three minutes and staining with diluted Giemsa stain for one hour. If such a smear is examined under the sixth or twelfth objective, the liver nuclei are found to have dense conglomerations of darkly stained chromatin in the centre with the rest of the chromatin around the margin, while the cytoplasm is vacuolated and stains poorly. It is important not to confuse the normal nucleolus with an inclusion body and to make smears as soon after death as possible.

We have been able to reproduce this disease in dogs—ferrets are not susceptible—in its various clinical forms under our controlled conditions and this has enabled us to follow the less prominent clinical signs which occur in the milder forms of the disease. By paying particular attention to the cardiovascular signs it is possible to make a clinical diagnosis, subsequently proved to be correct, on animals which are only very slightly ill; in fact, so slight that the average dog owner would be unaware that they were running a temperature of up to 104°.

3. *Treatment.*—In our experience little other than good nursing is called for in most cases. If the animal survives the first 24 hours of the illness it is likely to survive anyway, so that one is usually presented with a dead dog or with a dog with good chances of recovery. In protracted cases, in which jaundice occurs, of course good nursing, maintenance of fluid intake and readily metabolised foods, such as glucose and protein hydrolosates, are indicated. If a dog is very ill, transfusion of whole blood from a recovered dog may be considered, but we have insufficient data yet to advise on the value of this treatment or of other biological therapy.

We have some evidence that the virus is much less easily killed than the Laidlaw-Dunkin virus, and that it may persist in a viable state for considerable periods. It is too early for us to say very much on this aspect of the epidemiology of the disease, but we are tending to think of it as one of adolescent dogs, which is very widely distributed in Great Britain and with every indication that it has been here for many years.

4. *Differential Diagnosis.*—The main points of differential diagnosis are: (1) in the peracute cases from peracute poisonings; (2) in the acute cases with jaundice from leptospirosis, and (3) in the subacute cases from other transient febrile illnesses, such as para-distemper, β-haemolytic streptococcal infection, etc., particularly the latter, as the tonsils are often enlarged in both the natural and experimental cases of viral hepatitis.

Neurological Disorders

1. *Canine-hysteria* has been a prominent prodromal sign in our epidemics of para-distemper and viral hepatitis, particularly in those dogs between four and 12 months old, rarely in the younger and older age groups. These observations confirm the views expressed before (Parry, 1948) that canine-hysteria represents a clinical syndrome of diverse aetiology and that in many cases agenised flour is not involved.

2. *Post-infective Encephalopathies.*—In this group I should like to place a heterogenous group of clinical syndromes, which occur at varying intervals following a febrile illness, clinically of viral type. The advantage of this term is that it does not carry any pathological connotation, but merely describes the functional deficit observed clinically. I think this is desirable because we are coming to realise more and more that the neuro-pathological basis of these disorders is extremely complex and in many cases no significant morphological lesion can be demonstrated.

The data obtained from following up the clinical cases of para-distemper and viral hepatitis for nine to 18 months allow us to make certain provisional observations. We have not observed any delayed neurological sequelae following viral hepatitis, but we have observed sequelae of two types in dogs that have had para-distemper. The first type were those which after a period of three to six weeks suddenly became affected with epileptic seizures of various types or in which the tremor rigidity syndrome (chorea) developed rapidly; in many instances the dog had to be destroyed to prevent self-mutilation. This type corresponds closely to the *post-infective encephalitis* of Perdrau and Pugh (1926).

More recently, however, from six to 12 months after the infection we have noted in dogs which apparently recovered fully at the time, a syndrome in which epileptic "grand-mal" and motor episodes have occurred, and in which changes of personality have become more and more conspicuous; these dogs would run round in circles and were generally restless, they were not fully aware of their surroundings, did not enter into the social activities of their kennel mates and in one instance developed a defect of vision. The bitches have also shown irregularities of the oestrus cycle. It is with this group of syndromes showing delayed effects, presumably due to the viral infection, that I would apply the term *post-infective Parkinsonism*. Mr. Hodgman and I have also seen several cases of this nature in consultation, and we feel quite confident that it does represent a clinical group and that on the basis of our experimental observations it is most likely to be a delayed sequel of para-distemper infection. There is, as far as we are aware, no therapy of any proved value. Our interest lies in attempting to determine the factors which allow this type of damage to the nervous system to develop and if possible to counteract them.

3. *"Scotch Cramp," and Disorders of Muscle Tone.*—"Scotch Cramp" is the name given to a syndrome seen most frequently in black Aberdeen Terriers in which there is a hypertonicity of the limb muscles which is periodic in its occurrence and which is most marked after slight exercise, often disappearing later; in some cases stiffness of the body is so severe that the animal is unable to move but, in general, most cases are mild, and the only sign is a slight stiffness of the hind legs and a tendency to carry one or other when trotting. Of the aetiology and treatment of this condition we know very little, but certain young animals do tend to improve as they grow older. We suspect a functional defect of the neuro-muscular apparatus to be responsible. We have recently seen cases in another breed which are very similar but which we think are due to a defect in the central nervous system, since there was a loss of peripheral sensation as well, a sign we have never seen in cases of "Scotch Cramp."

Some Other Problems

1. *Leukaemia.*—We have been investigating on a limited scale the chemotherapeutic treatment of leukaemia in dogs, a project which has been seriously handicapped by the lack of suitable cases, for we must have them in hospital for two to three weeks as the treatment necessitates repeated haematological examinations. We have confirmed the initial good response to urethane by mouth (Innes, Parry, & Berger, 1946), but these cases suffer a relapse and they are then refractory to further urethane therapy. We have therefore been investigating some of the newer anti-leukaemic drugs which have been developed primarily with a view to treating human cases, and one of them, trimethylol melamine, given intravenously as a 5 per cent. w/v suspension (Rose, Hendry & Walpole, 1950), has shown promise in the aleukaemic type of the disease, but was not effective in a case of fulminating lymphoblastic leukaemia. It is too early yet to give any real appraisal of these drugs, and indeed the whole classification of the leukaemias of the dog requires to be reviewed critically, before one can say precisely what syndrome one is actually dealing with.

2. *Sterility and Infertility.*—While we have not been able to institute any active research into this problem, we are accumulating some useful data from our breeding kennels and we have become aware of the possible rôle of previous viral infections on the reproductive behaviour and performance of the bitch. In particular, we have noted a rather high incidence of so-called "false oestrus" in bitches which have had para-distemper; the bitch becomes attractive to the male, does not produce the usual blood-stained vaginal discharge and will not stand to the dog. Mr. Hodgman and I would appreciate any comments that members would care to make on their own experiences of this broad problem.

The Research Programme of the Canine Research Station, Kennett

I propose only to speak of the scientific side of the work of the Station. It is just three years since Mr. Hodgman and I arrived in Newmarket without any staff, any place in which to work and without any supplies or facilities at all. Professor Miller kindly made two small rooms available for Mr. Hodgman, and put some loose-boxes at our disposal as temporary kennels, while, when I myself found a house, our first laboratory and animal houses were improvised in my stables. We were forced to use these most inadequate premises for the first 18 months, while the present premises at Kennett were being derequisitioned by the Army. The Kennett property consists of the remains of a thoroughbred racing establishment, 36 acres in all, which the Army had converted into a tank repair depot. The buildings had been gutted of all useful fittings before they came into our possession and we were without any main services. Over the past 18 months we have been able to improvise temporary laboratories and kennels on a very modest scale, which has permitted us to build up a small research unit. We are eagerly looking forward to the results of the capital expenditure promised in the coming year, which will give us our first properly constructed laboratory block and some much-needed animal accommo-

dation. You will appreciate that, owing to this lack of physical facilities, our research programme has had to be confined to such work as we could accomplish with our very limited resources, and, indeed, it is only in the last three months that we have been able to improvise animal houses which have allowed us to carry out some virus infection experiments.

The principle upon which we have been building our unit is that the problems of the dog in health and disease can perhaps be most effectively tackled by a team of three of four, each of whom should bring to the team a special knowledge of some branch of the basic biological sciences, and that by the pooling of this special knowledge we might throw some light on the fundamental scientific problems which must be answered before one can attempt to provide accurate answers to the many practical problems which arise in the field.

During the early period we were able to handle only simple clinico-patnological investigations and we therefore began with the problem of so-called " night blindness " in Red Irish Setters, a project which did not require any special laboratory or animal house accommodation. The next step was to build up breeding units to supply us, as far as is practicable, with disease-free dogs and ferrets for later studies of virus infections. These units have been established and staffed and we have been able to produce about 100 puppies and 150 ferrets in the past year. However, our isolation facilities are only just now being erected in the form of a double-ring fence around our stud dog unit, the necessity for which has been very vividly brought home by the occurrence, during the past 18 months, of two spontaneous epidemics, namely, of para-distemper, as we prefer to call " hard-pad " disease, last summer and this spring of viral hepatitis or Rubarth's disease. These occurrences have been turned to some advantage in that we have made a detailed clinical and pathological study of naturally occurring epidemics of these diseases, and in particular we have followed the subsequent clinical course of a number of animals severely affected with damage to the nervous system, to which I have already alluded. We hope, within the next 12 months, to have built up an organisation and facilities so that we shall be able to control more effectively such spontaneous epidemics, but they do serve to underline the experience gained by Laidlaw and Dunkin in the 1920s, namely, the paramount importance of the most rigid isolation.

We feel most strongly that any work on the virus diseases of the dog must be carried out under conditions of the most scrupulous isolation and with animals whose genetic, nutritional, microbiological and medical histories are known as far as is humanly possible. We have laid the foundations for a supply of suitable animals, but such work is necessarily slow to show immediate results of practical application.

Until the spring of this year Mr. Hodgman and I were the only professional members of the staff, although we had been fortunate in collecting a small team of laboratory technicians and animal attendants who are proving most enthusiastic and whose work is quite invaluable. This spring we were able to start a microbiological unit, staffed by a professional worker, Dr. Larin, and a technician. Laboratory supplies accumulated over the previous two years allowed us to set up this unit in an old prefabricated army hut within a few days of the workers joining us.

The Station has been planned in three main sections; first, a Hospital and Out-patients section just within the entrance courtyard; second, the main Research section, and, third, on a distant portion of the property, the Breeding section. These three sections are each self-contained and have their own staff. The scientific personnel wishing to enter them have to take proper precautions to prevent the carrying of infection. The main Research section consists of three parts—the centre being the clinical block with medical, surgical and X-ray facilities, which connects the animal wards on one side to the main laboratories on the other. Normally the only entrance to the animal wards will be through a room where protective overalls are put on. By these means we hope to reduce, as far as we can, the risk of the spread of infection either from *without in*—which has occurred in the past—or from *within out*, of which we have had as yet no evidence at all.

Some Requests

Although at the moment our resources are fully deployed in the research programmes that we have already initiated, which means that we cannot always undertake at short notice work on outbreaks of naturally occurring disease, there are certain problems upon which we are anxious to gain more information, and concerning which we should welcome the help of the profession.

1. *Haemorrhagic Gastro-enteritis of Greyhounds.*—If members come across any outbreaks of this disease, which was widely reported in the 1930s, under circumstances where it would be practicable for us to carry out careful field observation, we should be very grateful for information concerning them.

2. *Sterility and Infertility.*—As part of our long-term investigation of this problem we are anxious to gather data on the oestral cycle and breeding performance of representative samples of as many breeds as possible. We think that the best way would be to seek the co-operation of a limited number of breeders, whom one could rely upon absolutely to fill in the record forms accurately and conscientiously. The information will, of course, be treated as strictly confidential. Mr. Hodgman and I would be grateful if members would suggest the names of breeders whom they think would be willing to collaborate, and with whom they could put us in touch. We must have the full support of the veterinary advisers to the breeders, so that we may appraise accurately the rôles of infectious diseases and general kennel management.

3. *Preparations of Specimens.*—Finally, may I make one small plea. If you do have occasion to send us specimens, would you please do your utmost to see they reach us as fresh as possible, suitably labelled and accompanied by full clinical particulars. Samples of blood and urine, etc., for examination should be collected with full sterile precautions, and if you have a carcase for autopsy would you please see that we get it within 24 hours of death if it is humanly possible. It does make such a difference to the value of the report that we can make, both from your point of view and ours, if *post-mortem* decomposition is not advanced. In cases for pathological examination with eye and nervous disease we now find that it is essential to have the case in hospital and to use a general anaesthetic for euthanasia under our own conditions.

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METHODS OF SLAUGHTERING ANIMALS INTENDED FOR HUMAN FOOD—OLD AND NEW*

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It is difficult for the comparatively young person of to-day to conceive that, in the long history of man, it is only within relatively recent times that animal welfare has received any serious attention. This is not really surprising when one reflects that only within very modern times has human welfare been the subject of consideration and legislative practice in the progressive States—despite Christian teaching and that of many enlightened thinkers of the last few thousand years. One has only to read Dickens to appreciate the conditions under which the poor, both young and old, existed in the early days of the last century. Slavery in the British Empire was not abolished until 1833 at a cost to the taxpayer (in those days of low values) of £20,000,000 compensation; and not until an even later date in the U.S.A. How, then, could it be expected that animal welfare should receive serious consideration when human welfare was so neglected?

The treatment of animals awaiting slaughter was raised primarily in connection with the general problem of slaughtering and took a subsidiary place, in most cases, to the needs of " public health " (such as public amenities, the prevention of " nuisances " and the establishment of a system of meat inspection).

Moses was probably the first to lay down rules with regard to meat inspection, but although he is often quoted as the authority on the Jewish method of slaughter, I can find in the Bible no actual mention of detailed instructions concerning the slaughter of animals for human food, though conditions with regard to animals slaughtered in the sacrificial ritual are laid down. The former have been added by the Jewish law givers, from time to time, since the days of Moses and do not form part of the Bible or the Jewish equivalent. Moses, however, was not unmindful of animal welfare and, until comparatively recent times, the Jews, as a whole, were probably more " animal welfare minded " than many Christians. St. Paul taught that many of the Jewish religious practices were not incumbent on the Christians and it is on this account that Christians do not observe the practice of Jewish ritual slaughter.

The Mohammedans observe many of the injunctions of Moses, but they do not necessarily accept the usages of the Jews which have been dictated by the Jewish law givers after Mohamet. Islamic ritual slaughter is, therefore, based upon that of the Jews but does not follow it in all details and indeed may differ according to the particular Islamic sect which practises it.

In this country the slaughter of animals began to receive some attention in the early days of the last century in connection with animal welfare in general and many societies and small bodies were formed with this aim in view.

The R.S.P.C.A. began to take an interest in the slaughter of animals in 1824. In the first Minute Book of the Society, dated June 16th, 1824, there is a record of the following resolution being passed at a meeting held, appropriately enough, at the Old Slaughters' Coffee House in St. Martin's Lane:—" That a Committee be appointed to adopt measures for inspecting of markets and streets of the Metropolis, slaughterhouses and the conduct of coachmen, etc." Among the names of the first Committee members is that of William Wilberforce of slave traffic fame. It is of interest that he started Parliamentary action with regard to the abolition of the slave trade only three years previously and it was not until nine years later that the Act for the abolition of slavery in the British Empire received the Royal Assent.

Most slaughterhouses in those days, in the London area, were situated underground, and apparently it was the practice when unloading sheep from carts to throw them into the underground cellars without bothering whether or not they were injured in the process. The methods of slaughter were often revolting in the extreme—especially the common practice of cutting the legs of calves at intervals of time until the animals died of lack of blood. This practice persisted for many years and there are some living to-day who can remember this method of producing white veal. Not infrequently, many hours—even days—might elapse before death ensued.

Benjamin Ward Richardson founded the Model Abattoir Society (now administered by the Royal Sanitary Institute) in 1886 for reforms in slaughter practice and meat inspection. He was averse to many orthodox medical views and propounded certain erroneous theories on the clotting of blood which, incidentally, gained him the Astley Cooper Prize. It was the necessity to collect blood for this work that brought him into contact with slaughterhouses and slaughtering. He experimented with various anaesthetics —including electricity. Richardson was on the staff of the London Temperance Hospital, and in 1871 he read a paper before the Medical Society of London on " A Preliminary Research to Discover Practical Methods of Killing Animals without the Infliction of Pain." He extolled the pole-axe, skilfully used, but denounced the sticking of sheep, calves and pigs. He postulated the need for simplicity in method, certain and rapid abolition of consciousness without interference with the blood flow or deterioration in the quality of the flesh. He used electricity through the heads of rabbits and birds and pronounced it satisfactory for bringing about lack of feeling, but he did not find the method satisfactory in sheep—although he considered it could be made so. About the same time the Humanitarian League was concerned with similar problems. It upheld anti-vivisection and vegetarianism. One of its publications was entitled " Behind the Scenes in Slaughterhouses," by a barrister (H. F. Lester), and was published in 1892.

It is as well to bear in mind that when Queen Victoria ascended to the throne there were no sanitary laws and no laws for the protection of animals.

It was not until 1893 that the R.S.P.C.A. took active steps to devise better methods of slaughter. Local authorities were tardy in using the statutory powers conferred upon them in the Town Improvement Clauses Act of 1847 and extended in the Public Health Acts of 1875 and 1894, to provide public slaughterhouses, and in utilising their powers of inspection in relation to private slaughterhouses. The Local Government Board, now the Ministry of Health or the Ministry of Local Government and Planning, inserted clauses in respect of slaughterhouses in the model by-laws as far back as 1877, but it was not until 1909 that they suggested the stunning of animals prior to bleeding. In that year they recommended what was known as clause 9 to require the stunning of certain animals and, in 1915, they replaced it by 9A and 9B: 9A required all bovines and swine to be stunned, but the latter stated that *every* animal killed in the slaughterhouses should receive the benefit of stunning with a mechanically operated instru-

* Substance of an address given to the UFAW Summer School held at Flatford Mill, near Colchester, in September, 1950.

ment unless killed for the Jews. In due course quite a number of councils adopted one of these alternatives, amongst taem being the 28 London boroughs and the City of Manchester. Despite the powers of local authorities, the Departmental Committee on Meat Inspection in 1922 reported that most of the slaughtering in England was done in private slaughterhouses, the number of which approximated to 20,000, whilst the number of public abattoirs was probably less than 100. The Committee asserted that " many existing private slaughterhouses in this country are very insanitary or conducted in an unsatisfactory way, but the legal powers which are available do not enable the sanitary authorities to deal adequately with them."

In 1898, the question of public versus private slaughterhouses engaged the attention of the Public Health Committee of the London County Council. A report was presented by their Medical Officer, which stated that " the proper inspection of meat in the numerous slaughterhouses and butchers shops in London is a practical impossibility and nothing but the centralisation of the slaughtering and the provision of inspection stations will afford adequate protection to the public." It was proposed, as a first step, to set up six public abattoirs, three north and three south of the Thames. Much opposition, however, was raised on behalf of the meat trade, and the L.C.C., in 1898 and again in 1906 when reports were before them, resolved to proceed to the next business. When the question again came up in 1909, action was again deferred until the Government had made investigation into the whole subject. The number of private slaughterhouses in London had, however, undergone a remarkable and salutary reduction, from 1,500 in 1873 to 475 in 1897 and 159 in 1922, and to that extent more efficient inspection became possible.

In 1904 the Admiralty appointed a Departmental Committee to ascertain " the most humane and practicable methods of slaughtering animals for food and to investigate and report upon the existing slaughterhouse system," of which Mr. Lee (late Lord Lee of Fareham) was Chairman. They recommended that all animals should be stunned before blood was drawn; that, where possible, public should replace private slaughterhouses; that there should be uniformity of method of slaughter under efficient supervision and inspection; and that all slaughtermen should be licensed by the local authority. They also made suggestions for the improved construction of slaughterhouses. Sir Michael Foster and Professor Starling, in a joint memorandum to the Admiralty Committee, reported adversely on the Jewish method of slaughter from the point of view of the animals. The Committee considered that the poleaxe as used by an expert was, on the whole, the most satisfactory implement for slaughter, at that time. One of their suggestions was that sheep and pigs should first be stunned with a small club fitted with a heavy iron head. There were at the R.S.P.C.A.'s headquarters, some years ago, such clubs consisting of an iron ball—weighing 5 lb. or 6 lb.—with an ash handle about 3 ft. long.

In 1913 mechanical stunning, for cattle at least, was employed in 35 public abattoirs. The model by-laws 9A and 9B, issued by the Local Government Board in 1915, either of which it was open to any local authority to adopt, were reissued by the Ministry of Health in 1920 but, owing to opposition from the trade, a large number of local authorities did not acquire these powers. The attitude prevailing at the time can be illustrated by a court case.

The Reading magistrates in January, 1922, dismissed a summons under one of these by-laws, deeming it to be " unreasonable " on various grounds; but their decision was reversed, with costs, on appeal to the High Court, on June 15th, 1922, the case being remitted to the Justices with a direction to convict.

Model by-laws in regard to slaughter had, it is stated, been adopted by only 40 local authorities up to 1922. It was not until March, 1923, that the L.C.C. adopted by-law 9B and it appears to be the first body to have exempted Mohammedans from the provisions requiring animals to be stunned with a mechanically operated instrument—thus affording them the same privileges as the Jews. The modification of the by-law in favour of the Mohammedans, however, was not made until two years after the adoption by the L.C.C. of model by-law 9B.

Some control had, of course, been exercised with regard to the care of animals by various Acts from Richard Martin's Act of 1822, but the first comprehensive legislative measure to exert control over the infliction of unnecessary suffering on all classes of animals was the Protection of Animals Act of 1911. Although this Act specifically states that it does not apply to the slaughtering of animals for human food unless accompanied by the infliction of unnecessary suffering, obviously, if the degree of suffering exceeds that ordinarily imposed, legal proceedings may be taken—and the R.S.P.C.A. have not hesitated to take action where necessary. It was not until 1933 that the Slaughter of Animals Act, designed solely to protect animals in slaughterhouses and knackers' yards, was passed. Previously, there had been no fewer than six Bills presented to the House at intervals since 1911, all of which had failed to reach the statute book with the exception of one, in 1927, applying to Scotland only, which became effective in 1928. It is of interest to note that, whereas Parliament was ready to pass legislation the first time a Bill was presented applying to Scotland, it took 22 years for the same provisions to be made applicable to England. This was due to the fact that the interested parties in Scotland were agreeable, and indeed supported the reform, whilst opposition from butchers in England was strong. The 1933 Act applying to England and Wales was, in effect, prepared by the R.S.P.C.A. and was presented to Parliament by Sir Thomas Moore, an Ulsterman, representing Ayr Burghs. Incidentally, Sir Thomas (then Lt.-Col. Moore) was responsible for the Scottish Act of 1928 and he tried unsuccessfully to get a measure, for England only, passed in 1929.

The Slaughter of Animals Act is really an extension and modification of the old model by-laws. It provides for the licensing of slaughtermen, who are the men who actually perform the act of slaughter and who need not necessarily engage in other work; thus a single licensed slaughterman can carry out the actual slaughter of all animals in a slaughterhouse of reasonably moderate size, whilst the rest of the work—such as handling animals preparatory to the death blow and the subsequent dressing of the carcases—can be carried out by a number of unlicensed persons. The Act requires that all animals, save sheep, unless a special resolution of the local authority is passed to this effect, shall be stunned with a mechanically operated instrument. Pigs are also exempted unless a supply of electricity is available or can reasonably be made available. Animals slaughtered by the Jewish and Mohammedan ritual methods are exempted from mechanical or other stunning. It should be noted that the Act applies only to animals " slaughtered in a slaughterhouse or knacker's yard." The Act also contains provisions with regard to: driving the animals over ground which is likely to cause the animal to fall, feeding and watering of animals awaiting slaughter, the prevention of blood or other refuse within the sight or smell of any animal, and preventing (as far as practicable, without

structural alterations to existing premises) the slaughter of any animal within the view of another animal but not the carcase of an animal. It also requires that the heads of cattle and horses shall be securely fastened before stunning. This provision is not a wise one in so far as horses are concerned and is usually not adhered to—since the Act makes provision for special cases where strict observance of the Act would be prejudicial to the animal.

It is popularly supposed that animals are fully aware that they are destined for slaughter and that the sight of another animal being stunned increases their natural mental distress. My experience leads me to think that the degree of apprehension under such conditions is slight. It is frequently stated that the sight and smell of blood engender fear, but with this I cannot agree. Animals are strangely indifferent to such matters and human reactions are no guide to animal feeling under similar circumstances. Fear in animals awaiting slaughter can almost invariably be traced to other causes, such as parting them from the herd, the shouting and rough handling and other undesirable incidents which may, and unfortunately do, occur from time to time. Dragging a bullock's head down to a ring in the slaughterhouse wall, especially if accompanied by prodding, pushing and shouting, is much more likely to engender fear than the sight of the animal's surroundings. Horses can be led into a slaughterhouse and will wait with apparent indifference until shot with no constraint at all, except that of a slender rope halter held by the attendant.

The act of slaughter is accomplished by severing the large blood vessels in the neck with or without previously rendering the animal insensitive to the knife.

The essential feature in the Jewish ritual slaughter is the act of " Schechita," which is performed by the " Shochet " (or cutter), who makes a rapid incision across the throat with a very sharp knife; thus severing skin, muscles, blood vessels, windpipe and gullet. This cut must be complete and immediate and must not be accompanied by undue force or pressure, neither may there be any stabbing or tearing of the tissues. The knife must not be directed in a slanting manner and, after the incision, if there is damage to the knife—such as a nick—the carcase is rejected. The animal must be adequately controlled and immobilised before the act of " Schechita." This preliminary casting and positioning of the animal on its back with head forced forward to expose the underside of the neck is performed by the ordinary slaughterhouse workers. It is only when the animal is immobilised in the required position that the " Shochet " will consent to perform the act of cutting the throat.

In order to make the casting more humane, mats (upon which the beast could be cast) were introduced and later, the casting pen. These innovations were not received by many of the Jews with too obvious a display of enthusiasm and were the result of constant criticisms of the ritual method by Gentiles.

The casting by chain hobbles—often a hoisting tackle—accompanied by much discomfort and actual fright, can be a most revolting sight. A suitable casting pen, efficiently used, goes a great way towards removing the obvious objections to the Jewish methods of slaughter. Many of the pens in use in 1939 were discarded after the Ministry of Food took over slaughtering. The position deteriorated until shortly after the late war, when matters became so disquieting that the facts were brought to the notice of the authorities. The Ministry of Food then gave directions that, as from January 1st, 1950, all beasts destined for Jewish consumption should be passed through an approved casting pen. The Jews are very apprehensive when suggestions are made to alter the technique of their slaughtering methods and too frequently regard such suggestions as not merely directed towards the modification of this ritual but as part of a movement against Jewry in general; consequently, their attitude is often by no means co-operative.

Undoubtedly their methods were more humane than those of other peoples in the past ages, but to-day that cannot be said to be the case. Some religious practices have been abandoned with the passage of time, the introduction of humane laws by the State and the evolution of modern thought, but whilst laying aside certain practices imposed upon them by the old Jewish laws, the Jews still cling to their outmoded slaughtering rites. As they can readily dispose of those parts of the carcase which are considered " trepha " or which require arduous preparation—such as the hind quarters—to the Gentiles, they slaughter well over twice as much weight of meat as they themselves consume. Moreover, by no means all Jews adhere strictly to the old food laws; indeed, it would be logical to assume that the majority do not. Thus a number of animals, grossly in excess of those actually consumed by orthodox Jews, are slaughtered every week by the Jewish method and the surplus is eaten unknowingly by the Gentile population. In New York, at least 50 per cent. of all beasts killed for human food are slaughtered by the Jewish method.

Few animals are actually slaughtered in this country with Mohammedan ritual—most such animals are killed in slaughterhouses in ports by Moslem members of ships' crews. The essential part of the process appears to be the recitation of certain prescribed phrases at the time of the fatal cut, which is made by any person of the faith—not a specially trained and appointed " cutter." Neither is any special knife used, it is often one borrowed from one of the slaughtermen. Hence the end of the beast's life is likely to be less desirable than that of one despatched by the Jewish method. It must be stated that some Islamic theologians have declared that there can be no valid objection to the use of a mechanical stunner which does not kill the animal, provided the necessary words are uttered as the throat is severed. Other Moslem authorities, however, have not supported this proposed deviation from the established custom and have expressed a diametrically opposite opinion. The matter is, moreover, liable to varying views on account of different sects within the faith.

Satisfactory slaughtering should not only ensure the minimum of animal suffering, but it should allow as complete bleeding as possible and should not be accompanied by a deleterious effect on the meat, such as " splashing " (multiple, small areas of haemorrhage in muscles and other soft tissues), bruises and fractured limbs. Complete loss of blood is obviously impracticable, but under reasonably good conditions about half the total body content of blood should flow away. Fractures and splashing are more likely to be encountered after certain forms of stunning and may render such methods undesirable for all or certain species of animals.

Methods designed to bring about loss of feeling in the past have been concerned mainly with producing concussion of the brain and weapons both manually and mechanically operated have been devised for this purpose.

In this age of the machine, mechanical appliances are assumed, *ipso facto*, to be superior to the more old-fashioned methods, but this is not always so and often the very reverse can be the case if they are not efficient, kept in good working order, and used with skill and care.

The so-called humane killers are often thought to be intrinsically humane and the methods they have replaced inherently cruel. The pole-axe or felling hammer for cattle

and the maul for pigs can be used by an experienced and careful craftsman to bring about a rapid and perfectly humane ending and if, by mischance, the blow is not delivered correctly, the skilful operator often can speedily deliver another blow which only on very rare occasions fails to achieve its object. Such non-mechanical tools have the advantage of needing little attention for upkeep and of always being ready for use—there is no delay in removing the old cartridge case and replacing with a live charge or bullet—hence they are the means of repeated, expeditious use. They have two disadvantages, however; their use involves muscular effort which, in large slaughterhouses on a busy day, may result in muscular fatigue and impaired efficiency of the slaughterer, and the more important disadvantage that their efficient use requires skill which can only be obtained by practice. Although some degree of efficiency may be acquired by practice on the skull of a dead animal, real efficiency can be achieved only by use on the live animal with consequent risk of failures—and herein lies the gravest objection to their employment.

The mechanically operated instruments causing concussion are practically all operated by an explosive charge, and are of two types, one which discharges a bullet whilst the other type—which is in effect a mechanical pole-axe—fires a blank cartridge which impels a rod held in the instrument, the captive bolt pistol. The latter is the weapon of choice for general use on cattle. Weapons discharging a free bullet are liable to cause injury to the personnel in the slaughtering establishment, mostly through badly directed shots which pass out of the skull causing direct injury or injury as a result of ricocheting bullets. They also inflict injury upon all parts of the brain, limiting involuntary muscular movements and impairing the action of the respiratory and cardiac centres, thus tending to prevent the full flow of blow.

The Greener " Bell " gun, discharging a free bullet, was in use during the latter part of the last century, principally for the destruction of horses. They are very simple in construction, of sturdy build, and require very little attention for maintenance; consequently they have a long useful life —indeed many very old ones are still in use to-day by knacker-men. Major Derriman, Chief Secretary of the R.S.P.C.A., invented the R.S.P.C.A. Cattle Killer just prior to the 1914 war. This instrument, which discharges a very heavy bullet, is supported on the top of a long handle with remote control trigger mechanism which enables the user to stand at a distance from the animal. Major Derriman, an ex-Guardsman, may have seen an almost similar device (which was employed by Wellington's force in the Spanish Peninsular War) in the Rotunda military museum at Woolwich. He re-enlisted on the outbreak of the 1914 war and fell at Ypres. Various other " killers " were invented from time to time, including the Speary killer which was evolved by a butcher of that name from components of the old Verey Pistol used in the 1914 war. Records of the R.S.P.C.A. show that as far back as 1912 their staff was regularly engaged in giving demonstrations in the use of these appliances. The demonstrations ceased in 1915, but were renewed in 1920.

The Germans were the first to introduce a captive bolt type of weapon, the first of which was probably the Behr pistol. The original German pistols were unsatisfactory owing to the wrong type of steel being used for the bolts, with the result that they frequently bent or broke, and an already existing prejudice against any new slaughtering device was intensified. With the advent of the 1914 war, the German patents lapsed and Mr. Christopher Cash, a member of the R.S.P.C.A. Council, devoted a great deal of time and money in experimenting with a captive bolt type of instrument. As a result, he produced what is now known as the Cash Captive Bolt pistol. The Temple Cox instrument followed, and later the Douglas-Schermer, all of which are efficient captive bolt instruments, in daily use in our slaughtering establishments for all classes of animals save the horse, for which animal the captive bolt type of pistol is unsuitable—owing to the fact that when a horse is stunned it falls forward immediately and injury to the slaughterman or gun may result. For this reason a loose bullet instrument is preferable.

The fact that methods of slaughter involving the use of either the free bullet or captive bolt are liable to cause blood " splashing " in pigs prevented the adoption of mechanical methods in their slaughter—more particularly in bacon factories—and this objection was largely responsible for the introduction and widespread use of electrical " stunning " for pigs. The invention of the electrolethaler was brought to notice in this country largely as a result of the promotion of parliamentary bills with the object of making obligatory the use of " humane killers " for all food animals.

Electrical anaesthesia is by no means new. Benjamin Franklin in the 18th century and Benjamin Ward Richardson in the 19th, both carried out experiments with this end in view. D'Arsonval in 1890 used electricity to produce local narcosis and this was followed by the work on electrical anaesthesia by Hutchinson in 1892, Pampilion in 1901 and Leduc in 1902. More recently other workers, such as Ivy, Barry, Hertz and Silver and the Italian workers (Martini and others), and also Russian workers, have engaged in these studies. The work of these investigators was critically examined by Longley in 1944 and appeared as a UFAW publication. Hume likewise contended, in 1934, that the use of electrical methods in the slaughter of animals should not be regarded as necessarily humane. Longley in the *Veterinary Journal* of July and August, 1950, apparently modified the views he expressed in the UFAW publication. In the early 1930s the stunning of pigs by the electrolethaler was observed and reported upon by veterinary surgeons and human physiologists, all of whom were satisfied that it produced instantaneous unconsciousness. Professors McSwiney and Brocklehurst, together with others, carried out tests, at Woolwich and Bristol, on behalf of the R.S.P.C.A. and came to the conclusion that a state of unconsciousness was produced for the period necessary to hoist and stick the pigs. It was contended at the very outset that the immobility of the animals was not the result of loss of sensation but of paralysis of the muscles, and the R.S.P.C.A. specifically requested Professor McSwiney to report on this matter. He stated that " It is clear that after application of the current for 1·8 seconds the animals are in a state of unconsciousness which lasts for varying periods." Sir Leonard Hill was satisfied that the method was humane and in the Richardson Ward Memorial Lecture of 1934 said, with regard to the Jewish method of slaughter, " Given suitable methods of casting and confining the forelimbs, the Jews might avoid any possibility of reproach by using electric narcosis for cattle, as used for calves and sheep, so soon as they agree that it does not go against their ritual. To satisfy the Jewish ritual, it must be proved that no tissue damage is done by the electric stunning process. Exact research on the nerve cells of the brain can settle the question. To sum up, the electric stunning instrument makes the method of slaughter free from all objection."

Roos and Koopmans in the *Veterinary Journal,* 1934 and 1936, contended that the method was unsatisfactory and to their work must, to a large extent, be ascribed the scepticism which has arisen. If Longley's opinion, in his most recent publication, is to be accepted, then I am satisfied that these fears are groundless, but there is an urgent need for the matter to be investigated and refinements made in the apparatus should these be found necessary. Electrical " stunning " is also used in this country for calves and sheep. In South Africa it is widely used for cattle, the current being applied through the cerebrum by means of the Footner Mask.

Considerations of humane methods of slaughter are too frequently, and often exclusively, directed to the actual " stunning " or slaughtering process rather than to the total amount of animal suffering, *i.e.,* treatment prior to and during the act of slaughtering. They are often clouded by ideas concerning animal feeling which are based upon human reactions during contemplation of impending death. It is a debatable point if animals realise that they are being prepared for death. It is also too often implied that pain and mental anguish are directly related to a period of time. This is not necessarily the case. Time may be much prolonged during periods of mental stress and apprehension. Any who have been involved in some episode which they feared might result in death or severe injury will probably have very vivid recollections of the slow passage of time during such periods of mental stress. The suffering of animals awaiting slaughter and during the act can be assessed only by those who are trained to assess animal reaction and suffering and who have a wide experience of slaughterhouse practice. Many popularly acclaimed " experts " in such matters have made only occasional visits to slaughterhouses—too often " by appointment " to witness carefully staged demonstrations. The veterinary surgeon who has had daily experience of slaughterhouse procedure over a number of years is the only person who is really competent to form an opinion—in the light of any research which may have a bearing on any particular method of slaughter. The opinions of human physiologists and other scientists are of limited value and should be regarded only as an aid to the assessment of animal suffering by those who are familiar with all the various aspects of slaughterhouse practice and requirements and have as wide a knowledge as possible of animal behaviour—limited although our knowledge of this subject is, and must of necessity be.

Methods which might be quite satisfactory in a large and well-equipped establishment may be objectionable under entirely different circumstances in a small ill-equipped abattoir and vice versa. The speed necessarily attained in dealing with animals in a large factory abattoir may render methods, perfectly satisfactory in a more leisurely operated establishment, unsuitable and even objectionable and perhaps, under the altered circumstances, conducive to animal suffering.

The most important factor in preventing animal suffering is satisfactory slaughterhouse personnel. Experienced and skilful operators, who take a pride in their work, and who are not unmindful of the welfare of the animals, will perform their tasks in a commendable manner with whatever approved method may be in use, whilst unkindly or incompetent workmen will cause avoidable suffering even with the most perfect equipment. The need for the right kind of supervision is thus of paramount importance and, as supervision is impracticable unless the size of the abattoir warrants the appointment of qualified whole-time supervisors, the abattoir should be sufficiently large to support such appointments. Small slaughterhouses which are subjected to occasional visits of inspection obviously cannot be adequately supervised.

The Slaughter of Animals Act requires that only slaughtermen licensed by the local authority shall be permitted to stun or slaughter animals in slaughterhouses and knackers' yards, but no mention is made in the Act of a test of proficiency for these men and it is left to the discretion of each and every local authority to license whom they will. Furthermore, these licensed slaughtermen, who alone can be controlled by the fear of loss of their licences, form only a proportion of the staff of any slaughtering establishment. It is only in publicly owned abattoirs, where the staff are directly employed by the abattoir authority, that effective control of employees can be readily maintained and lack of consideration for the animals prevented by a fear of dismissal.

At the outbreak of the late war there were about 100 public and some 16,000 private slaughterhouses in operation in England and Wales in which a large number of sheep were permitted to be slaughtered without preliminary stunning.

Early in 1940 (as a result of meat rationing and the Ministry of Food assuming a monopoly of slaughtering) the number of slaughterhouses in use was reduced to 606 and still remains at about this figure. Prior to 1948, the slaughter of sheep continued, more or less, in the same manner as before the Ministry of Food assumed control and a large number of these animals (in those areas where the local authority had not included stunning of sheep within the requirements of the Slaughter of Animals Act, 1933) continued to be killed without previous stunning. In that year, as a result of questions in Parliament and representation by the R.S.P.C.A. and other animal welfare societies, the Minister of Food directed that, despite the neglect of certain local authorities to include sheep within the provisions of the Act, sheep—in common with all other animals—should be given the benefit of stunning. Thus all animals legally slaughtered for food in Great Britain should now be stunned with a mechanical appliance, except those killed by ritual methods.

The Government have consistently refused to give any statement of their intentions with regard to the reopening of the many thousands of slaughterhouses in use before the prohibition of private slaughtering. The report of the Interdepartmental Committee is shortly to be issued, when some statement of future policy may be made known. It is to be hoped that the number of slaughterhouses will remain limited or further reduced to enable more effective and uniform supervision of slaughtering operations. Meanwhile the Government have announced their intention to erect two experimental abattoirs which may serve as patterns for a few large abattoirs to meet the needs of the whole country.

Is it too much to hope that animal welfare may be prominently in the minds of the planners, or will the needs of animals be only a secondary consideration to the needs and the desire for speed of carcase output?

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PATHOLOGICAL COMMUNICATION

PATHOLOGY OF BRACKEN POISONING

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In cattle bracken poisoning results in an illness characterised by two essential features: (1) multiple haemorrhages, especially from the urinary and alimentary tracts; (2) for several days before death a sharp rise in body temperature, often to 107° F. (normal, 100° F. to 102·4° F.). These features are well known, but we have not found any account of the underlying pathology. For example, in the paper by Evans and Evans (1949, p. 176) it is stated: "Examination of the blood has failed to bring to light any significant abnormality, at least in the particular components tested. Similarly the consensus of opinion is that bacterial infection does not play the primary rôle in the causation of the disease." Therefore, it seems worth while summarising our findings on the pathology of bracken poisoning, as we have observed it in heifers fed experimentally on hay and sun-dried bracken in the ratio of 2 : 3 or on hay, molasses and bracken in the ratio of 1 : 1 : 3, and in natural cases of the disease.

In the peripheral blood of three experimental heifers we observed severe reductions in the thrombocytes and leucocytes as in the table.

Histological examination of the tissues of the cows which died revealed that the haemorrhages were of two kinds: (1) haemorrhages due to infarction with clumps of organisms: Gram-positive bacilli, Gram-positive cocco-bacilli or Gram-negative bacilli; (2) haemorrhages from small vessels in the submucosae or the subserosae. The second type of haemorrhage was of the perivascular type associated with thrombocytopenic purpura. In natural cases of the disease both types of haemorrhage were present.

In a preliminary investigation in which rats were given bracken as 40 per cent. of their diet, the findings were: (1) inanition, which may be attributed to vitamin B_1 deficiency, first described by Weswig, Freed and Haag (1946), and subsequently confirmed by Evans and Evans (1949) as a feature of bracken poisoning in rats; (2) severe damage to the bone marrow affecting the myeloid cells, which give rise to the granular leucocytes of the peripheral blood, and the megakaryocytes, which give rise to the thrombocytes; and (3) haemorrhages into the rectum, heart and lungs. These lesions were not present in a group of 12 rats fed on the same diet but given 120 μg. of vitamin B_1 a week in three intramuscular injections. Thus it seems that in the rat destruction of the bone marrow in bracken poisoning is mediated by a vitamin B_1 deficiency.

It should be noted, however, that in the rat vitamin B_1 deficiency alone does not give rise to bone marrow changes such as we have observed. Therefore, it is probable that in rats some disturbance is caused by bracken in addition to vitamin B_1 deficiency.

Whether vitamin B_1 deficiency plays any part in the disease in cattle has yet to be examined; so far no gross deficiency similar to that found in rats has been detected. However, the evidence emphasises that the blood pathology of the two animals has much in common, *viz.*, destruction of the granular cells and thrombocytes.

In the human subject gross reduction of the granular leucocytes leads to an illness, one of whose terminal features is bacterial invasion of the blood stream.

We think that the information in this note opens up an approach to better understanding of the pathology of bracken poisoning. We are continuing to investigate the problem on these lines.

Acknowledgments.—We wish to acknowledge our indebtedness to Dr. A. T. Phillipson, of the Physiology Department of this Institute, for much helpful discussion and for inviting us to examine the experimental heifers on which these studies were made; also to Dr. S. Jamieson, formerly of the Veterinary Investigation Laboratory of the North of Scotland College of Agriculture, for specimens from natural cases of bracken poisoning in cattle.

Table

Reduction of Thrombocytes and Leucocytes in the Blood of Three Heifers dying of Bracken Poisoning

Date	Heifer No. 1			Heifer No. 2			Heifer No. 3		
	Thrombocytes per c.mm.	Leucocytes per c.mm.	Polymorphonuclears (per cent. of leucocytes)	Thrombocytes per c.mm.	Leucocytes per c.mm.	Polymorphonuclears (per cent. of leucocytes)	Thrombocytes per c.mm.	Leucocytes per c.mm.	Polymorphonuclears (per cent. of leucocytes)
7.9.50	246,000	—	—	23,750	—	—	—	—	—
12.9.50	156,000	4,600	11	14,750	1,800	2	34,000	5,900	7
14.9.50	—	—	—	8,750	1,400	4	12,750	3,000	4
17.9.50	—	—	—		(Died)		—	—	—
19.9.50	39,500	750	0	—	—	—	37,000	1,000	0
21.9.50	51,500	850	0	—	—	—		(Died)	
22.9.50		(Died)		—	—	—	—	—	—

Normal range: Thrombocytes—131,000 to 400,000 per c.mm. Leucocytes—7,000 to 11,000 per c.mm. Polymorphonuclears—28 to 39 per cent. of leucocytes.

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CLINICAL COMMUNICATION

EFFECTS OF STREPTOMYCIN ON CHRONIC OTORRHOEA

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During the last three months a small quantity of streptomycin has been available and, amongst other things, it was decided to use it on some very old-standing cases of chronic otorrhoea.

Altogether, to time of writing, approximately 12 cases have been treated—three of these in Singapore and the remainder in Hong Kong.

Unfortunately the organisms could not be "typed" in any of the cases. It is felt, however, that in at least four cases Proteus was the organism with which we were dealing.

The treatment took the following form in the three Singapore cases. The excess pus, etc., was removed from the ear with cotton wool. 1,000,000 units of streptomycin were made up in 2 c.c. of sterile distilled water. 0·5 c.c. of this solution (250,000 units) was introduced into the ear twice daily for two days. In all three cases, on the third day a very thorough examination was made of the ear and it was found that complete resolution had been effected.

In all the other cases the treatment took the form of:—Ears washed out with hydrogen peroxide, 10 vols. 1 : 2 water and then 3 per cent. of sodium bicarbonate, thoroughly dried out with cotton wool and then streptomycin 100,000 units in 1 c.c. of sterile distilled water introduced once a day for four days. Complete resolution was effected in all cases.

Two dogs treated are worthy of particular mention, in that one had suffered on and off for at least 18 months with chronic otorrhoea, and, in another, treatment was begun just seven days prior to a dog show at which it was entered and eventually won.

PROBLEM OF HEAVY HORSE BREEDING DECLINE

"The continued decline in heavy horse breeding is causing considerable alarm among those who have the interests of the nation at heart (observes the *Scottish Farmer*) for in the event of a national emergency, supplies of petrol would almost certainly be drastically reduced, if not cut off altogether; and it would be a serious thing for home food production were no horses available for farm work. Britain is not the only country faced with this problem. It is also causing concern to farmers in Canada and Australia. The horse population of Canada has fallen rapidly during the past quarter of a century, and especially during the past decade. In Western Canada since the end of the war packing centres have been established for killing and canning horses for human consumption, and during the five years from 1946 to 1950 inclusive, no fewer than 163,533 horses were slaughtered in the Dominion, nearly all of them in Saskatchewan and Alberta. The number of horses appearing at the Canadian Spring Sales has been falling for some time, and this year only 125 horses reached the annual sale of the Manitoba Horse Breeders' Association held at Brandon in the third week of March, where over 300 were sold a year ago. Prices, however, were about £7 a head higher than they were last year. But Brandon is only one of the spring sales; and the sales scheduled for Regina, Lloydminster, Lacombe and Stettler have been cancelled for lack of entries, and there were only about 100 horses at Calgary."

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WEEKLY WISDOM

Leaders we must have, but the true leader is always a person who kindles others, helps them to find themselves and guides them in well-directed lines of activity—he does not relieve them of their duties, responsibilities and tasks.—RUFUS M. JONES.

ABSTRACTS

[Continuous Phenothiazine Therapy for Horses: III.—The Second Year of Treatment. TODD, A. C., HANSEN, M. F., WYANT, Z. N., CROWDUS, D. H., & CAWEIN, M. J. (1950.) *Vet. Med.* **45.** 429–434.]

Twelve horses, ranging in age from two to 18 years, were divided into four groups which were fed 0·5, 1, 2 and 4 grammes phenothiazine, respectively, on their grain ration at daily intervals since April 27th, 1948. At the end of the first year of the test one horse in each group was sacrificed and given complete *post-mortem* examination. In the first year of the study, a direct relation was found between amounts of phenothiazine fed and the reduction of the strongyle infection.

No significant blood changes developed in the 12 horses, or tissue changes in the four animals killed at the end of the first or second years. The physical condition of all the horses was always excellent.

The worm egg counts fell from 2,000 and upwards per gramme for all four groups to levels between 10 e.p.g. for the 4-gramme group, to 430 e.p.g. for the 0·5-gramme group at the beginning of the second year, while at the end of the second year all counts were below 100 e.p.g. and the 2- and 4-gramme groups were negative. Some of the eggs passed (from 18 to 48 per cent.) were infertile. The actual worm infections were reduced in proportion to the amounts of phenothiazine fed and there were significant reductions in the numbers of immature *S. vulgaris* in the anterior mesenteric artery and its branches.

The numbers of adult *S. vulgaris* in the horses killed at the end of the first year were 46, 3, 42 and 1, as compared with 53, 16, 7 and 0 at the end of the second year, all in order of ascending doses.

No evidence was found to indicate the development of resistance to the action of phenothiazine.

J. S. S.

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[Fatal Intussusception of the Canine Caecum Associated with the Presence of Toxoplasma in the Circular Muscle of the Ileum. BONSER, GEORGIANA M. (1950.) *J. Path. & Bact.* **62.** 650–653.]

The subject was a three-year-old mongrel bitch kept for experimental purposes, and treated with 3 : 4 : 5 : 6 dibenzcarbazole orally for over two years. Symptoms were those accompanying sudden collapse, which responded to treatment, but was followed by gradual loss of appetite, dullness, and two weeks later, death.

Post-mortem examination revealed an intussusception of the caecum into the colon. The intussusceptum was ulcerated distally and microscopic examination confirmed that the lesion was not of recent occurrence. The only other abnormality found was in the ileum, and consisted of several small dark areas in the mucous membrane, situated about 18 in. from the ileo-colic region. Microscopically these lesions showed extensive parasitic invasion of the smooth muscle cells of the circular coat by minute inclusions resembling the pseudocysts of toxoplasma. It is suggested that the presence of the protozoal parasites may have resulted in irregular peristalsis, thus causing intussusception, which by promoting subacute intestinal obstruction was responsible for death.

S. W. D.

REVIEW

[The Dairy Farmers' Veterinary Book. By NORMAN BARRON, M.R.C.V.S., PH.D. Pp. 188. 58 illustrations. Published by Dairy Farmer (Books), Ltd., 10, Tavern Street, Ipswich. Price 15s.]

This book is couched in simple language and should be easily understood by farmers and herdsmen. Sound advice is given on such subjects as calf rearing, management of down calving heifers, care of bulls, etc. The section dealing with the prevention and control of the common diseases of dairy stock is excellent. This is a subject on which the writer has expert knowledge and it justifies the publication.

When, however, he turns to advice on diagnosis and treatment of clinical conditions, his touch is less sure. Much of the advice on home treatments and first aid is not in accordance with modern clinical practice. Some of it is of little practical value, and would only delay the calling of veterinary assistance. As a stimulant after a difficult calving, either half a bottle of whisky or a proprietary "cleansing" drink are extraordinary alternatives.

The book is plentifully illustrated and many of the pictures are of interest. It is surprising to see under one group of pictures the footnote "Photos by Boots, the Farmers' Chemist."

One wonders why it is necessary for the list of "Farm Recipes" at the end of the book to be supplied by *The Dairy Farmer* advisory staff and not by the writer himself.

QUESTIONS IN PARLIAMENT

IMPORTED MEAT (INSPECTION)

Miss HORNSBY-SMITH (April 23rd) asked the Minister of Food if he is satisfied with the now accepted method of importing carcases of meat from which the glands have been removed in view of the fact that this process lessens the possibility of tracing disease.

Mr. F. WILLEY: There are provisions regulating the removal of glands. Moreover we require inspection before and after slaughter and the meat imported must be accompanied by an official certificate indicating that the inspections have been of the necessary standard.

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HILL CATTLE SUBSIDY

Mr. KENYON (April 23rd) asked the Minister of Agriculture whether he will now announce the rate of hill cattle subsidy for England and Wales for this year.

Mr. G. BROWN: Yes. The rate of subsidy for breeding cows and heifers suckling calves on hill land will be £5 per head and that for other eligible cattle £2 15s. per head. These compare with last year's rates of £4 and £2 17s. 6d. respectively. The rate for breeding cows and heifers has been increased to encourage the breeding of more hardy cattle on the hills in the interests of meat production. To achieve this increase a slight reduction in the rate for other eligible cattle has been necessary. To enable hill farmers to make plans ahead I take this opportunity of announcing that the new rates will continue in 1952 and 1953. The necessary Statutory Instrument will be laid before Parliament shortly.

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HORSES AND PONIES

Mr. DODDS-PARKER (April 26th) asked the Minister of Agriculture how many horses and ponies were slaughtered for food in the United Kingdom in 1949 and 1950, respectively.

Mr. T. WILLIAMS: I regret that the information is not available.

Mr. HURD asked the Minister of Agriculture what cost was incurred by the Central Office of Information in producing the film entitled "The Farmer's Horse"; and why it is considered necessary to spend public money to encourage farmers to make use of horses.

Mr. T. WILLIAMS: The expenditure incurred by the Central Office of Information in the making of this film was £4,013, of which £1 800 was defrayed by a grant received through the British Horse Society. The object of the film is to demonstrate to farmers the extent to which there are jobs which could still by done economically by the horse as an auxiliary to the tractor.

TORTOISES (CRUELTY)

Mr. H. HYND (April 26th) asked the Secretary of State for the Home Department whether, in view of the agreement which exists among the scientific experts concerned that cruelty is involved when tortoises are subjected to transport during their hibernating season, he will take steps to introduce legislation to prevent tortoises being brought into this country between September 1st and April 30th.

Mr. EDE: I can hold out no hope of the Government introducing legislation on this subject at the present time. Under the Protection of Animals Act, 1911, proceedings can be taken against a person for causing unnecessary suffering to tortoises.

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TORTOISES (IMPORT)

Mr. H. HYND (April 27th) asked the President of the Board of Trade whether he will give the names of the firms to whom licences were issued by his Department enabling them to import tortoises into this country during the past 12 months; and whether he has any information as to the extent to which such permission was used by these firms to import tortoises between September 1st last year and the present date.

Mr. BOTTOMLEY: Sixty-nine licences were issued for the import of tortoises during the period from April 1st to July 31st, 1950, but I regret that, in accordance with normal practice, I am not prepared to publish the names of the firms to whom such licences were issued. On August 1st, 1950, an open general licence was issued which allowed the import of live animals, including birds, fish and insects (with the exclusion of bees), from a large number of countries to which the policy of relaxation of import restrictions has been applied. Since that date, therefore, it has been possible to import tortoises from those countries without separate import licences. The answer to the second part of the Question is in the negative.

NOTES AND NEWS

Diary of Events

May 5th.—Meeting of the Biochemical Society, in the Department of Biochemistry, University of Oxford, South Parks Road, Oxford, 11 a.m.

May 9th.—Herts and Beds Division, N.V.M.A.: Luncheon and Annual General Meeting at Barnet (Salisbury Hotel), 1 p.m.

May 9th.—Special Meeting of the Editorial Committee, N.V.M.A., 2 p.m., followed by Meeting of the Editorial Executive Committee.

May 9th.—Meeting of the Society for the Study of Animal Breeding, at the Royal Veterinary College, London, N.W.1, 2.15 p.m.

May 10th.—Annual General Meeting of the Southern Counties Division, N.V.M.A., at Winchester (Royal Hotel, Peter Street), 6 p.m.

May 11th.—Meeting of the Lancashire Division, N.V.M.A., at Liverpool (Veterinary Hospital, Pembroke Gardens), 2.30 p.m.

May 16th.—Spring Meeting of the Eastern Counties Division, N.V.M.A., at Colchester (Red Lion Hotel), 2.15 p.m.

May 18th.—Annual General Meeting of the Welsh Branch, N.V.M.A., at Newtown (Bear Hotel), 2 p.m.

May 19th.—Annual General Meeting of the Society of Women Veterinary Surgeons at the Royal Veterinary College, Camden Town, 2 p.m.

May 23rd.—Meeting of the Technical Development Committee, N.V.M.A., at 36, Gordon Square, London, W.C.1, 10.30 a.m.

May 24th.—Annual General Meeting of the East Midlands Division, N.V.M.A., at Sutton Bonington, 2.15 p.m.

June 6th.—108th Annual General Meeting of the Royal College of Veterinary Surgeons at 10, Red Lion Square, London, W.C.1, 12 noon.

June 6th.—Annual General Meeting of the Victoria Veterinary Benevolent Fund, at 10, Red Lion Square, London, W.C.1—immediately following the above.

June 6th, 7th and 8th.—Meetings of Committees and Council, R.C.V.S., at 10, Red Lion Square, London, W.C.1.

Sept. 23rd-29th.—Sixty-ninth Annual General Meeting and Congress of the National Veterinary Medical Association, at Eastbourne.

R.C.V.S. Examinations

Thursday, May 10th.—Entries for D.V.S.M. Examination due.

Tuesday, May 15th.—Pharmacology, etc., Examination (Revised Syllabus). Written Examination.

Thursday, May 17th.—Pharmacology, etc., Examination (Revised Syllabus). Orals and Practicals (London and Dublin).

Thursday, June 7th.—D.V.S.M. Written Examinations commence at Edinburgh.

Monday, June 11th.—D.V.S.M. Oral Examinations commence.

Thursday, June 21st.—M.R.C.V.S. Written Examinations.

Friday, June 22nd.—M.R.C.V.S. Written Examinations.

QUARTERLY MEETINGS OF COUNCIL AND STANDING COMMITTEES N.V.M.A. DURING 1951

The following dates are given for remaining meetings this year, chiefly to give members plenty of time to reserve hotel accommodation.

In Edinburgh

Wednesday, July 11th:
11 a.m. Home Appointments Committee.
2 p.m. Organising Committee.
4 p.m. Parliamentary and Public Relations Committee.

Thursday, July 12th:
11 a.m. Veterinary State Medicine Committee.
2 p.m. General Purposes and Finance Committee.

Friday, July 13th:
11 a.m. Council.

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ROYAL (DICK) VETERINARY COLLEGE

It is regretted that alteration in the dates of the functions to mark the embodiment within the University of Edinburgh of the Royal (Dick) Veterinary College has been found to be necessary.

The functions as detailed in *The Veterinary Record* of April 28th should read: Thursday, May 31st, and Friday, June 1st.

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PERSONAL

Mr. C. W. Francis

Twenty-five Years' Service With the R.C.V.S.

At the recent quarterly meeting of the Council, R.C.V.S., a presentation was made to Mr. C. W. Francis, the Assistant Secretary and Accountant of the College.

This was to celebrate the fact that Mr. Francis had completed 25 years' service with the Royal College on November 15th, 1950. The presentation took the form of a canteen of cutlery, a small Chippendale card table and a wrist watch.

Tributes were paid to Mr. Francis' services by the President, Sir Thomas Dalling, and by the senior Vice-President, Mr. H. W. Dawes.

In replying, Mr. Francis mentioned that he had worked with 100 members of Council, who had been elected during the past 25 years, and had seen many changes. He also mentioned the great progress which had been made by the veterinary profession during his period of service with the Council. In his thanks he associated the name of his wife.

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Appointment.—The appointment in the Colonial Veterinary Service is announced of Miss Mary Maxted Sheahan, M.Sc. (T.C.D.), M.R.C.V.S., as Veterinary Research Officer, Nigeria.

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Birth.—Young.—On April 25th, 1951, at Chasebank Nursing Home, N.14, to Olive (*née* Brown) and Michael Young, M.R.C.V.S., of Ealing, W.5, a son—Nigel John Bowes.

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Young Farmers' Club Enthusiast.—Mr. John Suttie, M.R.C.V.S., of Inglewood, Forres, Morayshire, has been re-elected Chairman of the Highland Area Committee of the Scottish Association of Young Farmers' Clubs. Mr. Suttie has been a prominent figure in Y.F.C. affairs in Morayshire and the Highland area for a number of years. His appointment was confirmed at the annual meeting of the Scottish Association on April 14th.

"Home Help" from Denmark.—The daughter of a Danish veterinary surgeon—one of the many who kindly took the children of British veterinary surgeons into their homes a few years ago—would very much like to spend about six months in England, living with a family as a home help. She is coming over for a few weeks' holiday first but would hope to take this post on or around September 1st. Would anyone interested in having this girl kindly get in touch with Mrs. F. E. Somer, 14, Blyth Road, Bromley, Kent.

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R.C.V.S. OBITUARY

Taylor, James Harry, M.C., F.R.C.V.S., Major, late R.A.V.C., Thornton, Abbey Road, Darlington. Graduated London, December 15th, 1891; Fellowship December 15th, 1900. Died April 27th, 1951; aged 82 years.

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GENERAL OBITUARY

Samuel David Fitt

Royal Veterinary College Librarian

Mr. Fitt died on November 12th, 1950, at the home of his son, 55, Whippendell Road, Watford.

Old London students will read this notice with sorrow, for Mr. Fitt had reigned for long in charge of the College Library and he was respected by all with whom he came into contact.

Mr. Fitt was born in N.W. London, not far from the College, in March, 1878. He served his apprenticeship with W. H. Smith & Son, and in time was advanced to the post of manager of a branch. After some years with Smiths he moved to Hailsham, where he owned and conducted a stationers and booksellers business with a circulating library. In 1915, at the age of 37, he was called up for Army service. He could not find anyone to conduct his business and so the work of years had to go with the closure of the premises. He served in France with the 1/5th Gloucester Regiment at Ypres and in the awful days on the Somme. He was wounded and gassed.

On demobilisation in 1919 he was for a time at the Ministry of Education and later he had a bookshop in Hampstead.

Mr. Fitt was appointed Librarian at the Royal Veterinary College in 1924 and held the post until he retired at Christmas, 1941, whilst the College was sited in the Reading area. He continued to live in the bungalow at Sonning and held posts under the Air Ministry and with the War Damage Commission. In 1949 he went into full retirement.

Mr. Fitt was a kind, helpful man, who would go to great lengths to help the students. Quiet and unobtrusive, he will be remembered with gratitude and affection by all London students of his time.

J. McC.

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It has been decided to form an Eastern Counties Pedigree Pig Breeders' Association, and to promote sales and shows in the Eastern Counties under the auction rules of the N.P.B.A., and the Essex Pig Society. The Secretary is Mr. A. E. Vyse, of Mill Farm House, Pamdisford. The first show and sale promoted by the Association will be held at Cambridge on Monday, October 29th.

COLONIAL DEVELOPMENT CORPORATION'S REPORT, 1950*

Pilot Schemes Pressed for Following Failure of the Gambia Poultry Plan

Defective planning, mismanagement and lack of suitable staff are given as reasons for the failure of various colonial development schemes in the annual report of the corporation for 1950, which was published on Friday of last week. The report, which is acknowledged to have been written largely by Lord Reith, who succeeded Lord Trefgarne as Chairman in November, is particularly critical of the Gambia (West Africa) Poultry Scheme. We hope to deal in a future issue with certain aspects of this costly venture. In the meantime it may be noted that, speaking generally, the report records "both achievement and failure: encouragement and disappointment." Twenty-two new schemes were started in 1950, bringing the total to 50 spread over 22 territories, involving capital of £31,354,000 of which £10,175,962 have been spent.

Importance of Pilot Schemes

Discussing the background of certain operations, the report states that plans have been proved defective owing to inadequate local knowledge in their drawing; "There has not always been the requisite calibre and experience of managerial staff. There have been natural disasters on an extreme and unpredictable scale—flood, drought, disease.

"All this has emphasised the necessity whenever possible of experimental or pilot schemes—to produce the scientific and technical data required and to train the supervisory staff—before large-scale operation is launched."

The report on the Gambia poultry farm records the fact that a plan was prepared and approved on May 20th, 1948, before the formation of the Corporation's animal products division, and comments: "There were faults of planning, the consequences of which are now very plain. There was too much reliance on the local management. The Board now learn that the land could never have produced more than half what was originally expected of it." As to the poultry, fowl typhoid broke out and more than 30,000 birds—a third of the total—died. Seventy thousand pounds weight of poultry which had been slaughtered had afterwards to be destroyed because of a breakdown of the refrigeration plant.

It was not until the end of October, 1950, that misgivings came to a head. Enquiries were put in hand; the management changed; the investigatory mission despatched; the facts now known disclosed.

[Last February it was reported that Mr. Millard J. Phillips, the American poultry expert appointed in 1948 to manage the Gambia project, had resigned and returned to the United States.]

"However, despite all the mismanagement, it has been proved that the original poultry stock, together with their progeny, can be reared successfully in the Gambia: they are intrinsically healthy."

The Future

As a result of the Gambia failure two main alternative schemes are being investigated since the land, "denuded of trees and impoverished," cannot be left as it is. They are:

1. To wind up the poultry side. Transfer or dispose of all movable plant and equipment. Work the land as an agricultural scheme.

2. To continue a limited experiment for the next two years, reducing the flock to a size which present feeding-stuffs, augmented by the 1951 harvest and small purchases, can support. Controlled experiments on cleared land to determine possibilities for production of feeding-stuffs.

Each would entail further expenditure. A decision will be made very shortly.

Regarding the future of the Board's operations as a whole, the report says that organisation at headquarters is being clarified and strengthened: responsibilities better defined. It continues: "Measures have been taken to improve administrative and financial control throughout the whole organisation. Schemes which show little or no prospect of paving their way are being radically overhauled, as with the Gambia poultry farm. They will be shut down if no sound alternative can be devised. Regional controllers, resident abroad, are to be appointed. Devolution on them of authority and responsibility from headquarters will be as considerable and as speedy as individuals and circumstances permit."

* Colonial Development Corporation's Annual Report and Statement of Accounts, 1950. H.M.S.O., 2s.

AGRICULTURAL ADMINISTRATION IN THE COUNTIES

In its recently issued report, the committee appointed by the Minister of Agriculture, in 1949, with Mr. J. Ryan as Chairman, to review the organisation of the Ministry of Agriculture, makes a number of important proposals affecting the machinery for operating the many new services provided by the Ministry since pre-war days, in the endeavour to meet the obligation, which the national interest requires, that all our land should be made as productive as possible.

The committee recommends that the county agricultural executive committees should be freed as far as possible from administrative tasks, such as responsibility for trading services and schemes for the assistance of farmers. The Minister must have a body of practical men as represented in the C.A.E.C.s to act on his behalf in the county, but the main tasks of leadership in the industry in the counties and duties under Parts 2 and 3 of the Agriculture Act, 1947, are so important that the committees should be as free as possible of other burdens. It is recommended that the Ministry should establish county offices directly responsible to Whitehall to relieve the committees of administrative tasks.

The Advisory Service

The present integration of the National Agricultural Advisory Service with the C.A.E.C.s was made to further their common purpose of improving the efficiency of the industry. In the committee's view there must continue to be the closest association between them, but the advisory officers should cease to be attached to the C.A.E.C.s. The N.A.A.S. should function as a separate service. The officer in charge of the service in the county would no longer be the chief officer in the C.A.E.C., although his organisation would work alongside the C.A.E.C. with the same general objective; members of the N.A.A.S. would cease to act as officers to the district committees. At the county level there would be a chief advisory officer and working under his direction a corps of general advisers, each responsible for a specified area.

The report takes the view that there is great need for the Ministry to purvey technical advice as actively and widely as possible. Before the war few farmers made regular use of the technical advice from the agricultural staffs of the county councils. Agricultural education was much more effective in some counties than others. Now every county has—or is to have—a farm institute which can become the natural centre for advising farmers as well as for instructing farmers-to-be.

The committee rejects the proposal that the advisory service in England and Wales should be based, as in Scotland, on the agricultural colleges. It considers that any attempt to detach the N.A.A.S. from the Ministry would be retrogressive. The committee is confident that if its recommendations are adopted the net savings in both staff and expenditure will be substantial.

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R.C.V.S. CENTRAL LIBRARY FOR ANIMAL DISEASES

Accessions for the Quarter Ending March 31st, 1951

Benesch, F., and Wright, J. G. Veterinary obstetrics, including certain aspects of the physiology and pathology of reproduction in domestic animals. London: Baillière, Tindall & Cox, 1950.

Beveridge, W. I. B. The art of scientific investigation. London: William Heinemann Ltd., 1950.

Browning, C. H., and Mackie, T. J. Textbook of bacteriology (*eleventh edition* of Muir and Ritchie's "Manual"). London: Oxford University Press, 1949.

Ciba Foundation. Toxaemias of pregnancy, human and veterinary. A Ciba foundation symposium. London: J. & A. Churchill, Ltd., 1950.

Danielli, J. F. Cell Physiology and Pharmacology. New York: Elsevier Publishing Company Inc., 1950.

Darwin, C. The variation of animals and plants under domestication. London: John Murray, 1868.

The Encyclopaedia Britannica. *Eleventh edition*, 29 vols., 1911.

Ewing, W. R. Poultry nutrition. *Fourth edition*, revised. South Pasadena: W. Ray Ewing, 1951.

Focking, B. Nachweis der Echinokokkose mit Hilfe der Prazipitation und Intrakutanprobe an Schlachtschweinen and kunstliche sensibilidirtyrn kaninchen. Hanover: Tierärztlichen Hochschule, 1939 (Inaugural Dissertation).

Frauchiger, E., and Fankhauser, R. Die Nervenkrankheiten unserer Hunde. Bern: Hans Huber, 1949.

Kidd, W. Use-inheritance, illustrated by the direction of hair on the bodies of animals. London: Adam & Charles Black, 1901.

Linton, R. G., and Abrams, J. T. Animal nutrition and veterinary dietetics. *Third edition*. Edinburgh: W. Green & Son Ltd., 1950.

LONDON: Royal College of Physicians of London. The nomenclature of diseases, drawn up by a joint Committee appointed by the Royal College of Physicians of London. *Sixth edition.* London: H.M.S.O., 1931.

MARTIN, C. R. A. Practical food inspection *Fourth edition*, 2 vols. London: H. K. Lewis & Co. Ltd., 1950. Vol. 2 only.

REMLINGER, P., and BAILLY, J. La rage, Etudes cliniques, experimentales et immunologiques. Paris: Maloine, 1947.

ROMER, A. S. The vertebrate body. Philadelphia: W. B. Saunders Company, 1949.

SOLDERBEG, P. M. Cat breeding and general management. London: Cassell & Company, 1948.

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LEGAL NOTES

Dog Owners' Responsibilities

Mr. Justice Hilbery, in the King's Bench Division of the High Court on April 26th, in giving judgment for the plaintiff in a "poultry killed by dogs" case, commented that it was a simple one but one which must be of great general interest. His Lordship took the opportunity to add that it would not be incorrect to say that a large majority of the adult population kept dogs, and of that number few knew the full extent of their responsibilities, and perhaps fewer still acted with due regard to those responsibilities.

It could not be too widely known that ever since the Dogs Act, 1906, the owner of a dog was liable in damages for the injury which his dog did to other people's cattle. It was no longer necessary to show that the dog was vicious or had a propensity to chase other animals. The Act of 1906 recognised from the bitter experience of people living in the countryside that responsibility for the behaviour of dogs must be put on their owners.

The case before the Court was one in which Mr. William Ives, of Chester Avenue, Luton, Bedfordshire, in an action which he brought against Mrs. Phyllis Brewer, of No. 4, Wycombe Way, Luton, and Mr. Leonard Hayden, now of Newport Pagnell, Buckinghamshire, and at the material time at No. 11, Wycombe Way, Luton, claimed damages for injuries caused to his poultry by the spaniel owned by the first defendant and the mongrel dog owned by the second defendant.

The plaintiff's case was that on November 19th, 1947, the two dogs belonging to the defendants entered his smallholding at Wycombe Way, Streatley, Bedfordshire, and together chased his poultry. Between them the dogs killed 32 birds outright and injured nine others so seriously that they died the next day. Three of the slaughtered birds were cockerels and the rest were pullets. As a further result of the dogs' misbehaviour the rest of the fowls stopped laying until the following March, through the shock which they had sustained, and the plaintiff claimed damages for the loss which he had thereby suffered.

The defendants denied that theirs were the dogs which had entered the smallholding and "chased, worried, killed or injured" any poultry.

His Lordship said that he had no doubt that the dogs in question had done the damage which the plaintiff alleged.

As regarded the amount of damages, the only point which had troubled him was whether the plaintiff had acted reasonably in keeping the surviving fowls instead of selling them right away. After due consideration of that matter he (his Lordship) had decided that the plaintiff had minimised his injury by doing so and in endeavouring to nurse them back into laying eggs again.

There would be judgment for the plaintiff against both the defendants for £180; £18 for the death of the cockerels, £76 for the 38 pullets which had been killed, and £86 for the loss which the plaintiff had suffered by reason of the surviving fowls' failure to lay eggs.

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

SWINE FEVER:

Berks.—Graham Poultry Farm, Oakley Green, Windsor (Apr. 26th).

Cumberland.—Barffs Quarry Gardens, Distington (Apr. 25th).

Lanarks.—142, Strathcona Drive, Anniesland, Glasgow, W.3, Lanarkshire (Apr. 23rd).

Lancs.—Winwick Hall Farm, Winwick, Warrington (Apr. 23rd).

Norfolk.—"The Hall," Salhouse, Norwich (Apr. 23rd); Long Acres, Felthorpe Road, Taverham, Norwich (Apr. 24th); Valley Farm, Holt Road, Felthorpe (Apr. 28th).

Notts.—Fretwell Farm, Beckingham, Doncaster (Apr. 23rd).

Renfrewshire.—Berrymount, Greenock (Apr. 27th).

Surrey.—Frosbury Farm, Gravetts Lane, Worplesdon (Apr. 24th).

Sussex (W.)—Burchetts Farm, Wisborough-Green, Billinghurst (Apr. 25th).

Warwicks.—Moat Farm, Sheaf Lane, Sheldon, Birmingham (Apr. 26th).

Yorks (W.R.).—Hobart House, Cattal, Yorks; Church Farm, Sherburn-in-Elmet (Apr. 23rd); 10, Great Central Avenue, Balby (Disease at: Coronation Allotments, Balby, Doncaster) (Apr. 28th).

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ASSOCIATION FOR THE STUDY OF ANIMAL BEHAVIOUR

At the annual general meeting of the Association held on Monday, April 16th, 1951, in the Meeting Room of the Zoological Society of London, Regent's Park, N.W.8, the following were elected to office for the year 1951-52:—

President: W. H. Thorpe, M.A., SC.D., F.R.S.

Hon. Secretaries: A. N. Worden, M.A., M.R.C.V.S., F.R.I.C.; J. D. Carthy, M.A. (meetings and membership).

Hon. Treasurer: James Fisher, M.A.

Editor: A. N. Worden, M.A., M.R.C.V.S., F.R.I.C.

Asst. Editor: B. A. Cross, M.A., M.R.C.V.S.

Council: R. J. Bartlett, M.SC., J. T. Edwards, D.SC., M.R.C.V.S., John Hammond, M.A., D.SC., F.R.S., P. H. T. Hartley, M.A., E. Hindle, M.A., SC.D., F.R.S., L. Harrison Matthews, M.A., SC.D., C. F. A. Pantin, M.A., SC.D., Arthur Walton, M.A., PH.D., J. Z. Young, M.A., D.SC., F.R.S.

Reports on the year were provided by the Hon. Secretary and Hon. Treasurer, and it was stated that negotiations were in progress whereby it might prove possible to issue the *Bulletin of Animal Behaviour* regularly four times a year.

The following candidates were declared elected: Vernon David, M.R.C.V.S., P. D. Baylis, B.SC., J. R. Clarke, B.SC., W. van der Kloot, A.M., B.S., J. G. Gordon, B.SC., J. L. Corbett, B.SC., Margaret Ryle, M.SC., D. Paterson, B.SC., R. W. Rand, PH.D., B. T. Wicks, M.A., J. Reid, M.R.C.V.S., and S. A. Barnett, M.A.

At the conclusion of formal business Professor H. Hediger, Director of the Zoological Gardens, Basle, and author of the well-known work, recently translated into English, on *Wild Animals in Captivity*, presented a most interesting paper on "Territory in Animals and its Demarcation." There was a sustained discussion opened by Professor E. Hindle, who shortly retires from the post of Scientific Director of the Zoological Society of London.

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FOWL PEST CONTROL

Poultry Association Thanks the Ministry's Veterinary Officers

Through its General Secretary, Mr. John R. Harvey, the Poultry Association of Great Britain has expressed its appreciation of the "wonderful work done by the Animal Health Department of the Ministry of Agriculture and the Veterinary Officers employed by it in handling and dealing with the outbreaks of fowl pest which have in recent months afflicted the poultry industry of the United Kingdom." The Veterinary Officers have done devoted work in tackling the serious outbreaks of fowl pest that have occurred in recent months, and the Association feels that the industry owes a debt to them for their efficiency and energy.

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THE SOCIETY FOR THE STUDY OF ANIMAL BREEDING

The use of artificial insemination as a method of cattle breeding has become widespread in this country over the past ten years. The veterinary profession has played a major part in this development and in dealing with the many problems associated with fertility, genetics, animal husbandry and general administration which have been encountered. The work has now reached such proportions and importance that it is felt that there is scope for a new society to provide means for the discussion of these problems.

A society has therefore been founded by veterinary surgeons concerned with artificial insemination and animal breeding, to be known as "The Society for the Study of Animal Breeding," with Sir Thomas Dalling as President and Mr. D. L. Stewart, of Reading Cattle Breeding Centre, as Secretary.

The next meeting will be held at The Royal Veterinary College on May 9th, when a paper entitled "Analysis of Conception Rates and other Data on Artificial Insemination" will be given by Mr. A. F. Holt, of Dartington Hall.

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A tax of £5 is to be paid on all dogs over 15 inches at the shoulder in sheep-breeding areas in Natal. This ends a five-year search for a legal definition of a dog which can kill sheep.—*Farmer and Stockbreeder.*

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

REACTORS IN ATTESTED HERDS

Sir,—I cannot quite fathom the reason for the recent correspondence on the above subject.

The final interpretation of an official single intradermal comparative tuberculin test is always made by a whole-time veterinary officer of the Ministry. This, I consider, is an admirable safeguard to those who, like myself, are employed as L.V.I.s.

When reactors are found in an attested herd, there is usually an explanation, and the Animal Health Branch does not often fail to find it.

Admittedly the existing test leaves much to be desired and in all probability is not the final solution to the establishment of tubercle-free herds, but it is the best which, in the course of years, has been offered. No doubt our research workers will, in the not-too-distant future, produce a bovine tuberculin, specific for the detection of *active* lesions and unaffected by skin tuberculosis, etc.

Yours faithfully,

"Rothiemurchus," Winchester. J. F. D. TUTT.
April 23rd, 1951.

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ELECTROCUTION OF DOGS AND CATS

Sir,—May I apologise for not having commented earlier on Dr. Voûte's very interesting letter (*The Veterinary Record*, February 10th, in connection with my article of December 23rd), which I accidentally overlooked? Dr. Kok's measurements as quoted in that letter represent, so far as I am aware, the only attempt hitherto made to deal quantitatively with the electrocution of dogs in chambers. The conclusion to be drawn from them is that there is a very great need for fuller investigation.

In most cases death is said to have been "direct," in others to have occurred after a specified period. What is meant by "death" in this case? What criterion was employed? It is this question that has so often been begged, as a result of the passive appearance of an animal whose muscles are fully tetanised by electric stimulation.

I note that resistances were measured with the use of an 8-volt accumulator. This technique is wrong, and has been abandoned in electric convulsion treatment, for the reason that Ohm's law is not true for living tissue (*i.e.*, the resistance as defined by Ohm is not independent of the current).

The figures themselves are puzzling. The resistances are wrongly calculated with one exception. For instance, with 32·5 milliamperes from 150 volts the resistance is said to be 800 ohms, whereas clearly it should be 4,615.

What is rather disturbing is that the current is given as round about 40 mA, and part of this was shunted away from the heart through the forelegs. This would mean horrible torture, but I suspect that there is some mistake in the measurements.

Meanwhile, it is clear that these chambers should not at present be used for cats, whatever may be done about dogs. Dr. Voûte's electroencephalogram observation is an additional item of evidence to this effect.

Yours faithfully,

C. W. HUME.

The Universities Federation for Animal Welfare,
284, Regent's Park Road,
Finchley, London, N.3.
April 3rd, 1951.

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MINERAL REQUIREMENTS OF DAIRY COWS

Sir,—In my paper about the mineral nutrition of the dairy cow (reproduced in your issue of April 7th), when illustrating the unreasonably high level of early estimates of the calcium requirement of the dairy cow for maintenance, I gave Hennenberg's figures for the calcium and phosphorus requirements of the cow and said they were still to be found in the 1950 edition of "Animal Nutrition and Veterinary Dietetics."

Since then, in your correspondence columns, Dr. Abrams has denied that these figures are in his book. Whether such figures crept into the book during the régime of Professor Linton or Dr. Abrams is unknown to me, but let there be no mistake about it they are there. The following is quoted from page 305:—

"It is very difficult to state minimal requirements of calcium and phosphorus because the percentage utilisation of *that* (presumably these) in the intake varies greatly (page 64), but in the practical feeding of cows a sufficiency can usually be provided by giving 40 g. CaO and 22 g. P_2O_5 per 1,000 lb. live weight for maintenance and 17·4 g. CaO and 21·8 g. P_2O_5 per gallon (10 lb.) of milk."

Admittedly they are given as CaO and P_2O_5, but the equivalent elemental figures are almost identical with those given by Hennenberg and quoted by me. This is true when it is remembered that Dr. Woodman's version of the same figures is added.

One need look no further than the above extract, not only for the 1,000 lb. weight cow "beloved of calculators," but also for the "X point X grammes" of dietary minerals—an exemplary resort to decimals.

I have noted, when re-reading other parts of the text, the advice against an indiscriminate use of mineral mixtures and suggest, with deference, that this might well cover the feeding for maintenance of three times the amount of calcium regarded as reasonably sufficient for the purpose. Finally, let it be clearly understood that I am fully aware of the many variable factors which can influence nutrient requirements. My own round figures, while not disregarding such variables, were intended only as a guide to practical feeding conditions.

Yours faithfully,

2, Mansfield Road, Reading. K. IAN BOND.
April 25th, 1951.

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FOWL PARALYSIS

Sir,—I note in your issue of April 14th, a letter from Dr. F. C. Kelly of the Chilean Iodine Bureau commenting on a letter of mine you published in the issue of March 31st on the value of potassium iodide injections in fowl paralysis.

The purpose of my letter was to express my uncertainty of the value of these injections. The work Dr. Kelly quotes was not, to my mind, carried out over an adequate period of time on a number of birds sufficient to give statistically significant results in a disease of this kind.

The combined total of 15 birds (eight in Gray's series and seven in that of the Bureau) hardly supplied sufficient evidence I feel, and the main purpose of my original letter was to see what mass of evidence, for or against the treatment, could be collected.

Dr. Kelly speaks of a particular experiment done by the Iodine Bureau. Could he please say who was the expert who undertook the work?

Yours faithfully,

Spillers Ltd., W. M. MCKAY.
40, St. Mary Axe,
London, E.C.3.
April 26th, 1951.

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THE ECONOMICS OF VETERINARY PRACTICE

Sir,—With reference to previous correspondence on the above subject, I would like to suggest that the time to start worrying will be when the "struggling" farmers stop buying modern kitchen ranges, television sets and new, or even more expensive second-hand, motor cars!

Until then—and even after that—I think that most veterinary surgeons in general practice, who have reasonable business acumen, will be content to "rub along" without contemplating any such retrograde step as the formation of a national veterinary service, which would be equally detrimental to the interests of the veterinary profession, the farming community and the general public.

Yours faithfully,

Thetford Road, F. G. WADDINGTON.
Watton,
Norfolk.
April 28th, 1951.

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COURSES AT ILLINOIS

Sir,—In the March 17 issue of *The Veterinary Record*, on page 206, there appears a note to the effect that courses for veterinarians' wives are offered at Michigan State College.

It should be explained that this course is for the wives of veterinary students, approximately 50 of the 63 members of the graduating class of 1950 having been married. These students were veterans, their average age being about 28. The course for their wives was a very practical one dealing with such things as book-keeping, handling clients in the waiting room and on the telephone, the names, meaning and relative urgency of commoner diseases, as well as restraint and handling of pet animals.

Yours faithfully,

Department of Veterinary Anatomy,
University of Illinois, GEORGE A. LINTON,
College of Veterinary Medicine, *Instructor.*
Urbana,
Illinois.
April 17th, 1951.